

International Application No.: PCT/JP03/15209

U.S. Patent Application No.: Unknown

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claims 1-4 (canceled).

Claim 5 (new): A circuit including a choke coil, comprising:
first and second signal lines via which differential transmission communication is performed and on which a power supply current is sent out;
third and fourth signal lines via which differential transmission communication is performed and on which the power supply current returns; and
a choke coil having first, second, third, and fourth windings, and a magnetic core constituting a closed magnetic path in which the first, second, third, and fourth windings are wound; wherein
the first, second, third, and fourth windings are electrically connected to the first, second, third, and fourth signal lines, respectively;
the first winding and the second winding are wound in the same direction so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows, and the third winding and the fourth winding are wound in the same direction so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows; and
the first and second windings and the third and fourth windings are wound so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows.

Claim 6 (new): The circuit according to Claim 5, wherein each of the first bobbin and the second bobbin includes flange portions at both ends of the substantially cylindrical body portion thereof, and outer peripheries of the flange portions of the first bobbin contact with or are engaged with outer peripheries of the flange portions of the second bobbin.

Claim 7 (new): The circuit according to Claim 5, wherein one of an insulating resin member, a magnetic-powder-containing insulating resin member, a ferrite member having a surface that is coated with insulating resin, a metal member having a surface that is coated with insulating resin, and a metal member is placed between the first bobbin and the second bobbin.

Claim 8 (new): The circuit according to Claim 5, wherein the magnetic core includes two substantially U-shaped core members.

Claim 9 (new): The circuit according to Claim 5, further comprising two bobbins including substantially cylindrical body portions and flange portions at both ends of the substantially cylindrical body portions.

Claim 10 (new): The circuit according to Claim 9, wherein the flange portions include pairs of lead terminals connected to a respective one of the first, second, third and fourth windings, and the bobbins are arranged so that the substantially cylindrical body portions are substantially parallel to each other.

Claim 11 (new): The circuit according to Claim 5, wherein the first and second windings are wound by the same number of turns in the same direction so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 12 (new): The circuit according to Claim 5, wherein the third and fourth windings are wound by the same number of turns in the same direction so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 13 (new): The circuit according to Claim 5, wherein the first and second windings, and the third and fourth windings, are wound by the same number of turns so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 14 (new): The circuit according to Claim 5, further comprising two bobbins including substantially cylindrical body portions having holes provided therein, wherein the magnetic core includes two substantially U-shaped core members, the core members include arm portions and leg portions extending substantially perpendicularly from both ends of the arm portions, and the leg portions are inserted in the holes in the substantially cylindrical body portions of the bobbins.

Claim 15 (new): The circuit according to Claim 14, wherein the core members define one closed magnetic path in which leading ends of the leg portions abut against each other in the holes.

Claim 16 (new): The circuit according to Claim 15, further comprising a fitting plate having a substantially rectangular U-shaped configuration and arranged to bring abutting surfaces of the core members into close contact with each other.

Claim 17 (new): The circuit according to Claim 5, wherein the choke coil operates according to the IEEE 802.3af standard.

Claim 18 (new): A choke coil that is inserted in a signal line having communication and power-provision functions, comprising:

first and second bobbins each having a substantially cylindrical body portion; a first winding that is closely wound in a single layer on the substantially cylindrical body portion of the first bobbin and a second winding that is closely wound in a single layer over the first winding;

a third winding that is closely wound in a single layer on the substantially cylindrical body portion of the second bobbin and a fourth winding that is closely wound in a single layer over the third winding; and

a magnetic core having leg portions that are inserted through holes in the substantially cylindrical body portions of the first and second bobbins to define a closed magnetic path; wherein

the first winding and the second winding are wound in the same direction so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows;

the third winding and the fourth winding are wound in the same direction so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows; and

the first and second windings and the third and fourth windings are wound so that magnetic fluxes generated in the magnetic core are mutually strengthened when an in-phase noise current flows.

Claim 19 (new): The choke coil according to Claim 18, wherein each of the first bobbin and the second bobbin includes flange portions at both ends of the substantially cylindrical body portion thereof, and outer peripheries of the flange portions of the first bobbin contact with or are engaged with outer peripheries of the flange portions of the second bobbin.

Claim 20 (new): The choke coil according to Claim 18, wherein one of an insulating resin member, a magnetic-powder-containing insulating resin member, a ferrite member having a surface that is coated with insulating resin, a metal member having a surface that is coated with insulating resin, and a metal member is placed between the first bobbin and the second bobbin.

Claim 21 (new): The choke coil according to Claim 18, wherein the magnetic core includes two substantially U-shaped core members.

Claim 22 (new): The choke coil according to Claim 18, wherein the first and second bobbins include flange portions at both ends of the substantially cylindrical body portions and the flange portions include pairs of lead terminals connected to a respective one of the first, second, third and fourth windings, and the first and second bobbins are arranged so that the substantially cylindrical body portions are substantially parallel to each other.

Claim 23 (new): The choke coil according to Claim 18, wherein the first and second windings are wound by the same number of turns in the same direction so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 24 (new): The choke coil according to Claim 18, wherein the third and fourth windings are wound by the same number of turns in the same direction so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 25 (new): The choke coil according to Claim 18, wherein the first and second windings, and the third and fourth windings, are wound by the same number of turns so as to mutually strengthen magnetic fluxes when an in-phase noise current flows.

Claim 26 (new): The choke coil according to Claim 18, wherein the substantially cylindrical body portions of the first and second bobbins have holes provided therein, the magnetic core includes two substantially U-shaped core members, the core members include arm portions and the leg portions extend substantially perpendicularly from both ends of the arm portions, and the leg portions are inserted in the holes in the substantially cylindrical body portions of the bobbins.

Claim 27 (new): The choke coil according to Claim 26, further comprising a fitting plate having a substantially rectangular U-shaped configuration and arranged to bring abutting surfaces of the core members into close contact with each other.

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Claim 28 (new): The choke coil according to Claim 18, wherein the choke coil
operates according to the IEEE 802.3af standard.